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ABSTRACT

Research on instruction in the architecture studio is discussed drawing from current work in the psychology of teaching. Consideration is given to what instruction entails and the mental activities that occur when one is instructing. Difficulties in studying instruction are also addressed, and examples of research on instruction are based on studio instruction. The many and often conflicting conceptualizations of studio instruction are reviewed, from roots in the atelier to the work of today's cognitive theorists. The most recent research on teaching points to the urgency of studying both instructors' and students' thinking, processes of immense complexity. Studying complex thinking processes presents vexing methodological problems that have not yet been overcome. To illustrate both the possibilities for research and the insufficiency of today's research methods, the examples cover Dinham's current research findings on instructors' conceptions of their roles, instructional planning, simultaneous streams of thought, communication difficulties, and students' thinking. (Author/SW)

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RESEARCH ON INSTRUCTION IN THE ARCHITECTURE STUDIO: THEORETICAL CONCEPTUALIZATIONS, RESEARCH PROBLEMS, AND EXAMPLES

Presented at the 1987 annual Meetings of the
Mid-America College Art Association

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Abstract

Research on design studio instruction is a logical extension of the thread that stretches from designing to design thinking to design teaching. This paper reviews the many and often conflicting conceptualizations of studio instruction, from roots in the atelier to the work of today's cognitive theorists. The most recent research on teaching points to the urgency of studying both instructors' and students' thinking -- processes of immense complexity. The study of complex thinking processes presents vexing methodological problems which have not yet been overcome. To illustrate both the possibilities for research and the insufficiency of today's research methods, the paper concludes with examples from the author's current research findings on instructors' conceptions of their roles, instructional planning, simultaneous streams of thought, communication difficulties, and lastly on students' thinking.

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At first glance this topic may seem anomolous in a symposium dealing with research on design. It is my thesis, however, that teaching is a design task, and that effective teaching -- like effective architectural design -- occurs deliberately with conscious attention to alternative modes of thinking and alternative courses of action. Indeed many aspects of design and especially design research being discussed during this conference pertain to my own work. It is, therefore, not only fitting but important that when we consider design and design education we include thoughts on design education research.

Focus

What, exactly, do we mean by giving the title "research on instruction in the architecture studio?" Why not analytic criticism of architectural education? Or research on all of architectural education? Or research on teaching--not just instruction? Why such a narrow topic? By way of introducing the topic, I propose several reasons for this present focus.

The subject of this paper and the thrust of my own research has been the place--and the events--we call the "design studio." While there is some controversy about whether the architecture curriculum should be crafted as an integrated whole, through the years the studio has come to be the curriculum's core, whether for better or worse (Rapoport, 1984; Beckley, 1984; Kasparowitz, 1983). Moreover, while there is an extensive literature on instruction in traditional lectures and seminars, there is virtually none on studio teaching in architecture. For several reasons, then, it is studio instruction that bears our current scrutiny.

In my current research I am examining the idiosyncrasies of studio instruction not through the time-honored methods of analytic criticism, but rather through the methods of empirical research that -- although equally time-honored -- arise from different intellectual traditions. There are those in architecture, however, who would question whether research is possible on a subject as diffuse and controversial as architectural education. Some believe that it is impossible to study teaching (seen as ineffably personal), to study learning (seen as bewilderingly idiosyncratic) or to study thinking (seen as too complex for scrutiny). This is nonsense, of course; it is just as much nonsense as the assertion that because every architectural project is unique there are no general principles of design that would apply. The possibilities for empirical research in architectural education have been discussed elsewhere (Dinham, 1987c) with a variety of examples.

And what of focusing on teaching <u>vs</u> instruction? "Teaching" involves a broad constellation of activities -- planning for instruction (such as in writing the next studio assignment), reading material to prepare for next week, advising students, meeting with other faculty, directing theses, sitting on reviews, and of course, contact with students in the classroom and studio. This latter we call "instruction" (even though this word carries an unfortunate information-dispensing connotation we will hasten to dispel).

Overview

I propose in this paper, then, to discuss research on instruction in the architecture studio from several perspectives. First, it is illuminating

to remind ourselves of the many and often conflicting conceptions of instruction -- to determine exactly what instruction entails, and to examine the mental activities that occur when one is "instructing." This review draws heavily from the very recent writings about research on teaching. Next, I mention some of the vexing problems in studying instruction. And last, I show some instances from my own research on studio instruction as examples of research on instruction. Altogether, the paper intends to demonstrate how current work in the psychology of teaching can expand our view of architectural studio teaching.

What is Instruction?

For architecture, discussions of teaching inevitably deal with Beaux-Arts and Bauhaus traditions. The contrasts are deep and well-known, and need no repetition here. It is interesting to consider, however, that a good part of the contrast lies in conceptions of the proper curriculum for architecture, more than in the day-to-day involvement of apprentice with master. Indeed, the notion of apprenticeship figures prominantly in both conceptions, although of course the atelier differed markedly from the workshop. The momentary interaction of master and apprentice could appear to an observer roughly the same in both settings, if the writing of early participants is to be believed (Esherick, 1983; Gropius, 1983). Perhaps what differed most, considering the Beaux-Arts vs Bauhaus emphasis upon curriculum purposes and design, was how the masters thought about their students, thoughts of which we have little record.

Today, masters' thinking about instruction is most likely to be revealed in their comments on architectural education in general. In interviews of design faculty at Berkeley (Parman & Kwei, 1987), for example, a remarkable divergence in views emerged. Mark Mack said, "Teaching design is straightforward. You are a little more experienced than your students, and can offer some of that experience towards their problem-solving activity" (p. 9). Dick Peters offered a more complicated analysis in saying his interest is in "assisting students to develop. I see them as self-motivated. I'm not interested in imposing my own framework on what they do. I want them to have confidence in their own design decisions....I try to show the students a range of solutions,....to see both the uniqueness and the similarities (p. 10). Don Lyndon spoke to the complexity of changing design instruction habits: "Design teaching has enormous inertia behind it--to actually change how a studio works takes lots of doing" (p. 8).

Looking outside architecture, we find that conceptions of teaching from traditional psychological sources have long been insufficient for explaining the subtleties of studio teaching. In the heyday of behaviorism, research on teaching consisted of studying "teacher behaviors," such as use of the chalkboard or liveliness in lecturing. The model of teaching held in many instructors' mind has been the "teacher as teller," a model that persists in many university settings today, although far less so in the studio. The teacher-as-controller-of-information model has persisted as well in traditional systems for evaluating teachng in colleges and universities, systems that place special attention to how information is dispersed, and that are woefully inadequate for capturing the richness of studio instruction.

More recent conceptualizations of instruction apply more felicitously to the studio. One model proposes that the instructor is a manager, or orchestrator, of a myriad of elements occurring simultaneously in a studio--indeed occurring simultaneously in the individual students' minds. The "orchestrator" model is useful in reminding us how complex the intellectual task of instruction can be, and just how many ideas must be retained consciously and unconsciously in the instructor's mind.

Both the "controller" model and the "orchestrator" models emphasize the instructor, however, rather than the student. They both imply that responsibility for student learning lies largely with the instructor. Wisely, teachers have long found this far too simplistic an explanation of instruction, and consequently have found these models insufficient. Moreover, recent research on learning suggests that these traditional views of teaching grossly underestimate the requirements for successful instruction.

From a variety of sources have arisen in the past few decades the view that teaching involves designing an environment in which students' learning will be maximized (e.g. Entwistle & Ramsden, 1983; Yinger & Villar, 1986). The "designer" model of instruction is based on contemporary cognitive learning theories, which posit that learning is undertaken by students seeking to make sense of their immediate (intellectual and personal) environment, piecing together (1) their understanding of the field with (2) their view of their own abilities and accomplishments; they do this in (3) extraordinarily complex social settings -- classrooms or studios -- where action and meaning are (4) jointly defined by students and instructors (Cazden, 1986; Doyle, 1986). In sum, successful instruction takes place in a multidimensional setting where learning is jointly constructed by instructors and students working together (Yinger & Villar, 1986, p. 2).

Designing such an environment is an extremely challenging task. Attacking this challenge requires -- as with all complex practical problems -- the expertise of experienced professionals. From recent writings on how expert professionals in other fields perceive and approach practical problems have come a host of interesting views on how professional teachers design the complex environment in which instruction occurs (Peterson, 1987; Schon, 1987; Yinger, 1987). Professionals are seen as "practitioners who specialize in designing practical courses of action to serve the needs of a particular client group." They design practical courses of action in complex situations -- i.e. instruction -- and "what allows them to do this is a thoughtful and purposeful consideration of their (instructional) practice" (Yinger, 1987, p. 26). The conclusion architecture educators can draw from this rich literature is that architecture studio instructors are dual professionals: they are both architects and studio instructors, simultaneously performing dual professional tasks, each of immense complexity.

The current research on instructor's thinking is yielding new and revealing pictures of teaching as a complex intellectual activity. For example, this reasearch

> ...suggests that what teachers do is strongly influenced by what and how they think, i.e. little of what teachers do is merely

> spontaneously reactive. Also, teaching...is based on thoughtful and systematic (though often implicit) notions about students, subject matter, teaching environments, and the teaching process itself. ....Teaching involves complex social and interactional processes such as clear communication, mutual negotiation of action, and joint construction of meaning. Also, experienced teachers draw upon and successfully orchestrate tremendously large bodies of knowledge (subject matter, social, technique) in idiosyncratic contexts. (Yinger, 1987, p. 27)

There could be no more eloquent argument for new research on studio instructors' thinking than this description of the rich untapped complexity of instruction. In a symposium dealing with research on design, we can see that the challenges posed for research on design instruction are monumental, and monumentally intriguing.

The Methods for Research
On Design Studio Instruction

The new conceptualizations of teaching briefly outlined above call for visionary and complex research methods beyond our current abilities.

There have been two major streams of research methods for studio teaching, observation studies and survey studies. Observation studies are best exemplified for architecture educators by the monumental Architecture Education Study (Porter and Kilbridge, 1978), which rested on a series of extensive cases observed at several schools and meticulously analyzed by an experienced and sophisticated team. That Study, whose perceptive conclusions and insightful recommendations have been sadly ignored, concentrated more on students' experiences than instructors' thinking, revealing important findings about the realities of young architects' experiences but offering little to guide instruction in particular or the improvement of teaching in general. Another set of observation studies is our own (Dinham, 1987a; 1987b; 1988).

Survey studies employing questionnaires and interviews have been done by Anthony (1987), who concentrated on juries, and Kasparowitz (1983), whose master's thesis compared three design fields, principally from an organizational perspective. Neither of these researchers had the funding to rival the Architecture Education Study's magnitude, and neither was able to examine studio teaching itself, although Kasparowitz interviewed faculty members extensively and drew conclusions about their thinking on architecture education in general.

If no research on studio instructors' thinking has yet been done, what methods might be considered for the future? Over the years the research on teaching in other fields has concentrated, as have the theoretical conceptualizations of instruction, on the instructor's behavior and particularly its link to student performance on tests (Dunkin, 1986). If instruction is conceived as designing, however, these "process---product" models for research on teaching are woefully inadequate. More promising is the research on problem solving, with particular attention to solving ill-structured problems (e.g. Voss & Post, in press) and the kinds of problems Rowe so vividly discusses as "wicked" design problems (1987).

Research on instructors' thinking has employed surveys, observations, interviews, and many other research techniques, none entirely satisfactory. Most recently, an approach called "stimulated recall" has been popular: videotapes of instruction (whether with an entire classroom or a single student) are played back for the teacher and a trained questioner, who together try to reconstruct the teacher's thinking. This technique has seemed the most promising for studio research, because representation is so important in architectural instruction. However, very recent writers have disputed the validity of this technique, pointing to problems of perspective and of short-term versus long-term memory of fleeting thoughts (e.g. Peterson, 1987; Yinger & Villar, 1986). These problems notwithstanding, there seems to be no other solution for research on studio instruction, short of ESP or hypnosis.

Yinger and Villar offer assistance in other areas, however. Their paper suggests research questions for studying instructors' thinking (or, as they term it, "thinking-in-action"): they ask what form thinking-in-action takes, especially in planning vs in interaction with students; they are currently asking what theories, strategies, roles, etc. thinking-in-action is directed toward, and they study the kinds of language instructors employ in understanding and describing their own thinking-in-action (1986, p. 4). It is conceivable that these questions can provide a starting point for research on studio instructors' thinking as well.

More recently, Yinger has expanded the realm of methods for research on instructors' thinking by pointing out that thinking involves more than merely moment-to-moment decision making. Research on instructional thinking, he proposes, must of necessity provide access to more than psychological instructional methods; it must also involve the social interaction and cultural context of -- in our case -- the design studio. He recommends a combination of (1) ethnographic techniques borrowed from cultural anthropology, (2) microanalysis of the (design) task and its required intellectual operations, and (3) detailed probing of instructors' knowledge, theories, and beliefs (1987, p. 33).

Examples of Current Research

That current research on studio instruction lags behind its potential, and is severely constrained by methodological problems, should be apparent from the preceeding discussion. Nonetheless, researchers on studio instruction continue to be intrigued by the complexities of the studio environment as a place where the most remarkable instruction and learning takes place (for example Anthony, 1987; Dinham, 1986; 1987a, 1987b; Incel, 1987; Schon, 1987). Several examples from my own work can illustrate the questions that research on studio teaching can illuminate. These examples are taken from an extensive observational study of teaching in four schools of architecture (Dinham, 1987a,b).

Conceptions of Roles

One of the most arresting sections of the now legendary Architecture Education Study (Porter & Kilbridge, 1978) analyzes the dynamics of final reviews. The introductory lines of that analysis quote a student and a reviewer commenting on their expectations for the review:

Student: "There are a lot of students in the class who want to hear something about their designs..."

Critic: "The only reason why I'm here is to talk about whatever this thing (design) triggers in my mind. I am not here to listen to endless explanations of students who tell me what's on their minds. It's as simple as that..." (Vol II p. 492)

Instructors' conceptions of their roles cannot help but influence their approach to -- and thinking about -- students' work. Even in the same year's studio course in the same school, instructors show markedly different patterns of working with students. Ben, a part time critic in the third year of a five year architecture curriculum, believes himself responsible to tell students when their work is "bullshit" and to let them know how it would be received in the "real world," where he practices singularly innovative residential architecture. In the same studio, 50 feet away, Walter sits before a student's board, head in hands, silently looking at everything the student has done since their last desk crit: he questions the student and pursues her answers in a lengthy conversation; he makes suggestions through the conversation and summarizes his recommendations before moving on to the next board (Incel, 1987). The Berkeley interviews include Lars Lerup's explication of his role: he uses "the kiss/kick teaching method....you try to get them to be both their own best friend and their own hardest critic. I am very critical in the kicking state, but I try to separate people from the work, and then kick the work--unless they've been lazy" (Parman & Kwei, p. 8).

Planning

Studio instructors are eager to explain their educational ideas. Thomas (teacher in fourth year studio) tells me his intention is for the students to think, versus merely doing better designs. His studio style includes questioning which he refers to as "socractic," and efforts to engage other students in criticizing each student's ongoing work. Matt (teacher in Level I studio, in the third of a four year program) explains that he sees an interim review early in the project as a chance for inexperienced students to become accustomed to presenting, a timesaver for him because at early stages of a complex project he repeats himself in individual desk crits, and a chance for him to reflect aloud on the thought processes he wants students to employ in attacking this project. Todd explains to students at the start of a senior year final review that since he knows that students mediate what they are told by a jury, and do not necessarily hear everything clearly, he would recommend that they ask a friend to take notes for them, and he offers to meet with individual students after the jury to discuss their reviews and make clear what he thought they should have gleaned from the review.

Simultaneous Streams of Thought

That instructors think simultaneously about myriad aspects of even a single student's work and thought is obvious to every experienced instructor. This theme, already discussed above, is one of the most complicated challenges facing research on studio instruction. One vignette can illustrate the richness of thinking that every instructor will recognize. In a fourth-year (of a five-year curriculum, the second

of three design years) studio penultimate review, Elfred and Ron are together reviewing their joint group of 30 students. The two mix comments about Henry's (1) oral and (2) visual presentations this afternoon, his (3) thinking process and (4) how it brought him to the present design solution, and the (5) design products seen in the site analysis, model, plans, elevations, and sections. Questions on the five topics are intermingled, and in his answers Henry responds separately to each question but pursues no overall line of argument about his work. Through the questions and answers the critics and Henry develop an understanding on how the project's products should be put into finished form for Henry's portfolio, but there are no concluding summaries of how Henry's design thinking should be refined or improved.

Difficult Communication

An extensive study of communication patterns undertaken as part of the Architecture Education Study (Argyris, 1978) yielded profound observations and conclusions. In general, that study illustrated more communications gone awry than not, and proposed models for explaining and correcting communication difficulties. My own research has likewise divulged complicated patterns of incomplete or missed communication. Ben, a studio critic described above, is a talented praticing architect but his talent is nowhere evidenced in his instruction. While observing him particularly in reviews I asked myself whether Ben is unable to express his ideas in words. When he is negative, he is very personally negative; when he is positive, he is vague. He seems intent on delivering his message, not on students' understanding of it.

Despite architecture's reputation for negative public reviews (Anthony, 1987), expressing negative judgments in desk crits is very difficult for some instructors, and even in interim and final reviews their circumlocutions betray their discomfort. June, one of the most effective instructors in my study, finds negative criticism particularly difficult. One of her students, who has been consistently unprepared throughout the project (an urban monastery), and who consequently has never had a desk crit, arrives at the review with the least developed of all the students' work. June begins by asking "what's the unifying concept?" and after a limited answer then asks the observing students "what does anyone else think?" With no discussion forthcoming, she continues, "you have the same problem Scott had, putting visitors, monks, and novices in the same building. Do you think that's OK?" (Student gives a weak rationale.) "The criticisms of Scott's work apply to you too. Do you think these are good ideas?" She continues, "Maybe you may have too many contradictions here. For example, this solution might be on any piece of land, even a flat site (the site is a hillside)....(Then concluding) I'm not saying it can't be done, but you've a thin line between something that can be done and something perverse here. You should think what you want it to be about, for example your idea about progression through life, and then decide how to approach it that way." With this student and with others, when June doesn't approve of a student's solution she hints to the student and asks other students to comment, which they often seem loath to do. She often persists, however, in eliciting from the onlooking students the judgments she herself has made, after which she can assume her customary -- and presumably more comfortable -- role of summarizing and advising.

Student Thinking

While this paper has concentrated on instructor thinking, Peterson (1987), Yinger (1987), other writers, and common sense all suggest that to understand the educational porocess fully researchers must examine not only instructor thinking but student thinking as well. Student thinking is, after all, the goal of education.

Research on student thinking is as difficult as research on teacher thinking. The Architecture Education Study has given us the most complete picture of student thinking thus far because of its probing interviews with students whose desk crits and reviews were also observed. In my own research I have to date been able only to surmise from indirect evidence the kinds of thinking the studio instills in students. As an example, however, I focused on student responses to criticism in final reviews. It was clear from the outset that mixed messages were inevitable; our concern was that the mixture can cause confusion for students. For example, suggestions for improvement are interwoven with negative criticism; the onlooker wonders whether students can distinguish these themes either during the review or later. Inadequate work often brings on the most oblique language; whether students realize that the obliqueness signals inadequate performance is yet to be determined. Sometimes students are led through a series of "socratic" questions designed to make a point; whether an aggressive questioning style fosters understanding under stress is another matter for further research. And both at the board and in reviews, instructors and reviewers often discuss design, thinking-about-design, and design presentation alternately; students' comprehension of these messages could easily be confused.

Aside from the problems of mixed messages, however, students learn early to deal with negative criticism. One strategy is to deny credibility to any opinion other than one's own, and therefore to merely endure for the moment the teacher's or reviewer's judgments. Another is to deny the complexity of the criticism and conclude merely "they liked it" or "he doesn't like it." Students who benefit most from negative criticism seems -- not unexpectedly -- to be the mature students with more than the typical undergraduate's life experiences, who can sort the complicated critical messages as they arrive and respond to them on the spot. Students seem to learn more from negative criticism when they follow a negative comment with a question, a clarification, or a rationale that teachers or reviewers can expand upon. This stategy can backfire, however; there is a risk of being seen as a "whiner." Occasionally the student encounters a reviewer like the one quoted above who has no interest whatsoever in students' thinking.

Discussion

These richly evocative and painfully familiar examples illustrate the complexity of instruction in the design studio, underscoring the importance of studying teachers' and students' thinking. The methods for such studies will be difficult to fashion and the funding difficult to pursue. Nonetheless, only by revealing the complications of studio instructors' and students' thinking can we illuminate and someday understand the processes we call "learning to design."

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